The Importance of Data in Behavior-Based Safety

Data in Science

In the history of science, measuring and recording of data has been essential in helping us to understand cause and effect. Lord Kelvin said "…when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the state of *Science*..."

Data and BBS

The success of behavior-based safety has been due to the fact that is based on data and observations of people doing their jobs. We don't have to know what people are thinking or what their beliefs and attitudes are; those things are surely important, but we don't have direct access to them so we can't know them for certain. **But we can see what people do**, and that's what's important in safety. People on the job do things that put them at risk, or they do things in a different way that's safer.

The important thing to understand about BBS is that it is **evidence-based**. Why is this so important? Because you know your interventions work *if and only if* you can demonstrate a change in the way people do things on the shop floor. No

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need to speculate, no need to take shots in the dark. The BBS process generates evidence we can see and measure. And the best part of all, it works!

> *BBS is evidence-based. You never need to guess about what works and what doesn't. Just measure it and you'll know!*

To change your OSHA incident rate in the right direction, you have to engineer solutions in the work environment and remove hazardous conditions. But **the work environment also controls how people do their jobs**, and the behavior of those people is one factor that increases or decreases risk. The observation and feedback process is part of how we can influence the behavior of people on the shop floor. Lord Kelvin also said "If you can not measure it, you can not improve it." **The BBS process is an opportunity for "continuous improvement"** with performance data being the key to monitor the health of the process and guide its success.

Now that we've established that BBS is evidence-based, what questions can we answer with data? Here's a partial list.

- What proportion of the workforce is participating in our BBS process? Is the workforce engaged or is it complacent?
- What proportion of them have been trained to do observation and feedback?
- How many observations are being performed? Is this number trending up or down?
- Which behaviors are most troublesome (concerns), and conversely, which are most under good control (safe)? What is the trend for the "pinpoint" behaviors of interest?
- What comments do the observers make, and how are they dealt with by the Safety Steering Committee? Which ones become action items, and are they completed in a timely manner?
- Which observers are high performers whose contributions to the BBS process should be recognized?

Why Not Use a Spreadsheet?

It sounds simple to collect and store the data. Many organizations first try to do it with spreadsheets. They quickly discover that **spreadsheets have their limitations**. Data can only be entered in the master copy of the spreadsheet, and entering data accurately into the rows and columns of a spreadsheet can be tedious. While one worksheet might reference another, it is difficult to develop a system of interconnecting worksheets that has anything like the power of a relational database. And spreadsheets can quickly be overwhelmed and become unworkable with too much data, so they only work for smaller organizations. But the great wealth of information in the body of observations, including the comments of the observers, is difficult to extract from a spreadsheet.

Why Not Let the I.T. Department Build a System?

Well, then – why not have the company's IT department develop a relational database? The first answer has to do with "**core competencies**." The IT department needs to focus its efforts on problems that are unique to your business. It takes a long time to develop a database schema that fully supports the BBS process, and an understanding that is difficult to express as a set of requirements that IT needs to get started. And relational databases have some of the same issues as spreadsheets in terms of ease of getting information in and out. The IT department can develop **user interfaces** for data entry and report/chart generation to make their new system more usable. But this can be

very expensive and take the IT department months if not years to complete. *Why reinvent this wheel?*

SOPA is based on a powerful relational database – Microsoft's SQL Server 2008. The database schema is as complex as it needs to be with nearly 100 tables, each of which is structured similar to a spreadsheet, but which have a richly interconnected structure between tables. It was developed over the last 10 years by Paul Paiva, the President of the Front Range SQL Server Users group and the SOPA application developer. It has many stored procedures ("procs") and data integrity ("FK") rules. And in addition, there is a large library of interconnected scripts to make it easier to get data in and out of the database. These were written by an expert in software human factors, and usability is one of our core values. Together, the scripts and database are an **integrated package (SOPA®)** which ideally supports the BBS process.

The success of any BBS process rests on the data. We think the SOPA relational database and scripts represent the best approach to supporting your process.